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dishwasher with (determining turbidity)

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☐ 1. Document ID: US 5586567 A

L1: Entry 1 of 3

File: USPT

Dec 24, 1996

US-PAT-NO: 5586567

DOCUMENT-IDENTIFIER: US 5586567 A

TITLE: Dishwasher with turbidity sensing mechanism

DATE-ISSUED: December 24, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Smith; John M.	Louisville	KY		
Schneider; David A.	Louisville	KY		
Dausch; Mark E.	Latham	NY		
Whipple, III; Walter	Amsterdam	NY		

US-CL-CURRENT: [134/57D](#); [134/113](#), [356/442](#), [68/12.02](#), [68/12.27](#)

ABSTRACT:

A turbidity sensing mechanism for a dishwasher is connected in the fluid circulation conduit between the pump and the spray mechanism. The mechanism includes a hollow housing enclosing a hollow transparent tube connected in fluid flow relationship with the conduit. A source of electromagnetic radiation and a radiation-to-frequency sensor are positioned inside the housing on opposite sides of the tube.

10 Claims, 4 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 3

[Full](#)[Title](#)[Citation](#)[Front](#)[Review](#)[Classification](#)[Date](#)[Reference](#)[Abstract](#)[Detailed Description](#)[Claims](#)[KWOC](#)[Draw Data](#)

☐ 2. Document ID: US 3888269 A

L1: Entry 2 of 3

File: USPT

Jun 10, 1975

US-PAT-NO: 3888269

DOCUMENT-IDENTIFIER: US 3888269 A

**** See image for [Certificate of Correction](#) ****

TITLE: Control system for dishwasher

DATE-ISSUED: June 10, 1975

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bashark; Larry Thomas	St. Joseph	MI		

US-CL-CURRENT: 134/57D; 134/113, 68/12.15, 68/12.18, 68/12.22, 68/12.27

ABSTRACT:

A dishwasher having a single control pushbutton adapted to perform a multiplicity of different dishwashing and dish treating operations. The dishwasher includes an improved automatic control which has the capability to determine an optimum treatment of the dishes in the dishwasher based on the condition of the dishes when they are in the dishwasher. The control not only causes the dishwasher to effect an amount of washing of the dishes necessary to substantially fully clean the dishes irrespective of the condition of the dishes when placed therein, but also may automatically cause the dishes to be merely rinsed and dried where the dishes are only dusty and no washing is required. Structure for receiving suitable charges of dishwashing detergent and the like are incorporated in the dishwasher and the control responds includes means for responding to the provision of such detergent for automatically effecting use of the detergent at the appropriate time in the dishwashing cycle. The control further automatically senses the cleanliness condition of the dishes at the end of each subcycle and automatically controls the length of the drying cycle so as to terminate the drying cycle substantially immediately upon completion of the drying of the dishes.

13 Claims, 7 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 4

Full	Title	Citation	Front	Review	Classification	Date	Reference	Abstract	Claims	Keywords	Drawings
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☐ 3. Document ID: US 3870417 A

L1: Entry 3 of 3

File: USPT

Mar 11, 1975

US-PAT-NO: 3870417

DOCUMENT-IDENTIFIER: US 3870417 A

TITLE: SENSOR FOR DISHWASHER

DATE-ISSUED: March 11, 1975

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bashark; Larry Thomas	St. Joseph	MI		

US-CL-CURRENT: 356/442; 134/57D

ABSTRACT:

A method and apparatus for determining the condition of liquid, such as a dishwashing liquid, including means for determining the turbidity of the liquid and means for determining a preselected amount of evaporation of the liquid so as to determine a dryness condition. Means are provided for directing light radiation upwardly into the liquid and for sensing the light radiation reflected either from solids carried by the liquid to provide a turbidity determination or reflected from the underside of the upper surface of the liquid to provide a dryness determination.

28 Claims, 3 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 2

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw De
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Term	Documents
DISHWASHER	6860
DISHWASHERS	4007
DETERMINING	964172
DETERMININGS	24
TURBIDITY	21355
TURBIDITIES	552
TURBIDITYS	0
(DISHWASHER WITH (DETERMINING ADJ TURBIDITY)) .PGPB, USPT.	3
(DISHWASHER WITH (DETERMINING TURBIDITY)) .PGPB, USPT.	3

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L1: Entry 2 of 3

File: USPT

Jun 10, 1975

DOCUMENT-IDENTIFIER: US 3888269 A

**** See image for Certificate of Correction ****

TITLE: Control system for dishwasher

Brief Summary Text (26):

The sensing means of the present invention is illustrated in greater detail in my copending application Serial No. 380,101, filed July 17, 1973, entitled "Sensor For Dishwasher," (PA-4654). Said application is incorporated by reference herein and may be referred to for a detailed description of the structure and functioning of the sensing means. Briefly, however, the sensing means includes means for directing light radiation upwardly into dish treating liquid collected in a shallow receptacle communicating with the dishwashing chamber. Means are provided for sensing the light radiation reflected either from the solids carried by the liquid above the receptacle to provide a turbidity determination, or reflected from the underside of the upper surface of collected liquid in the receptacle to provide the dryness determination. Thus, the same sensor is used for determining the turbidity condition of the rinse water as to determine the number of cycles to be effected in the dishwasher, as well as to determine the dryness condition of the dishes in the final, drying cycle as a function of the decrease in the quantity of water remaining in the shallow collecting receptacle. The decrease in the depth of this collected water is caused by the drying action of the heating element in the dishwasher chamber, the receptacle being in communication with the chamber so as to cause evaporation of the collected water at a rate proportional to the rate of drying of the dishes in the chamber.

CLAIMS:

10. The dishwasher structure of claim 7 wherein said control includes means for determining the turbidity of fill rinse water after a preselected amount of rinse operation and causing the dispensing of the detergent from said cup into the rinse water to convert the rinse operation to a wash operation in the event the sensed turbidity is less than said preselected amount.

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